Claims

1.   A Viterbi decoder for decoding convolution-coded data blocks, the decoder comprising a memory (314) for storing a decision matrix and path metric processing means (33) for populating the decision matrix in the memory (314) with decision values on the basis of soft decision bits representing an input convolution-coded data block, **characterised in that** the number of elements of said memory (314), used for storing the decision matrix, is less than the product of the number of valid states for the input convolution-encoded data block and the number of symbols in the input convolution-encoded data block.

2.   A Viterbi decoder according to claim 1, wherein said number is an integer sub-multiple of said product.

3.   A Viterbi decoder according to claim 1 or 2, wherein the path metric processing means (33) is configured for storing path metric sets associated respectively with a plurality of spaced symbols in the input convolution-coded data block and perform path metric processing for distinct sections of an input convolution-encoded data block using respective ones of said stored path metric sets as a starting state.

4.   A Viterbi decoder according to claim 1, 2 or 3, including a traceback unit (34), wherein the path metric processing means (33) is responsive to detection of an error in the decoded data to regenerate a partial decision matrix including a bad decision and the traceback unit (34) is responsive to the detection of said error to modify the decoded data by tracing back a second best path through said partial decision matrix from said bad decision.

5.   A Viterbi decoder according to claim 4, wherein the path metric processing means (33) is responsive to detection of an error in the decoded data to regenerate a first partial decision matrix including a bad decision and a second partial decision matrix for symbols immediately preceding those for which the first partial decision matrix was regenerated, and the traceback unit (34) is responsive to the detection of

said error to modify the decoded data by tracing back a second best path through said first and second partial decision matrices from said bad decision.

6.   A Viterbi decoder according to claim 4, wherein said partial decision matrix covers a predetermined number of symbols preceding said bad decision.

7.   A Viterbi decoding method for decoding convolution-coded data blocks, the method comprising processing path metrics on the basis of input soft decision bits, representing an input convolution-coded data block, to populate a decision matrix in a memory with decision values, **characterised in that** the number of elements of said memory, used for storing the decision matrix, is less than the product of the number of valid states for the input convolution-encoded data block and the number of symbols in the input convolution-encoded data block.

8.   A method according to claim 7, wherein said number is an integer sub-multiple of said product.

9.   A method according to claim 7 or 8, including storing path metric sets, associated respectively with a plurality of spaced symbols in the input convolution-coded data block, wherein the path metric processing is performed for distinct sections of an input convolution-encoded data block using respective ones of said stored path metric sets as a starting state.

10.   A method according to claim 7, 8 or 9, including responding to the detection of an error in the decoded data to regenerate a partial decision matrix including a bad decision and modifying the decoded data by tracing back a second best path through said partial decision matrix from said bad decision.

11.   A method according to claim 10, including responding to detection of an error in the decoded data by regenerating a first partial decision matrix including a bad decision and a second partial decision matrix for symbols immediately preceding those for which the first partial decision matrix was regenerated, and

modifying the decoded data by tracing back a second best path through said first and second partial decision matrices from said bad decision.

12. A method according to claim 10, wherein said partial decision matrix covers a predetermined number of symbols preceding said bad decision.

13. A Viterbi decoder for decoding convolution-coded data blocks, the decoder comprising:

       a decision matrix memory for storing a decision matrix;

       path metric processing unit for populating the decision matrix in the memory with decision values on the basis of soft decision bits representing an input convolution-coded data block; and

       traceback unit;

       wherein the number of elements of said memory, used for storing the decision matrix, is less than the product of the number of valid states for the input convolution-encoded data block and the number of symbols in the input convolution-encoded data block.

14. A Viterbi decoder according to claim 13, wherein said number is an integer sub-multiple of said product.

15. A Viterbi decoder according to claim 13, including:

       a path metric memory for storing path metric sets associated respectively with a plurality of spaced symbols in the input convolution-coded data block;

       wherein the path metric processing unit is configured for storing path metric sets, associated respectively with a plurality of spaced symbols in the input convolution-coded data block, in said path metric memory and perform path metric processing for distinct sections of an input convolution-encoded data block using respective path metric sets, read from said path metric memory, as the starting states.

16. A Viterbi decoder according to claim 13, including an error detector for detecting error in the decoded data, wherein the path metric processing unit is

responsive to detection of an error by the error detector to regenerate a partial decision matrix including a bad decision and the traceback unit is responsive to the detection of an error by the error detector to modify the decoded data by tracing back a second best path through said partial decision matrix from said bad decision.

17.   A Viterbi decoder according to claim 16, wherein the path metric processing unit is responsive to detection of an error by the error detector to regenerate a first partial decision matrix including a bad decision and a second partial decision matrix for symbols immediately preceding those for which the first partial decision matrix was regenerated, and the traceback unit is responsive to the detection of said error by the error detector to modify the decoded data by tracing back a second best path through said first and second partial decision matrices from said bad decision.

18.   A Viterbi decoder according to claim 16, wherein said partial decision matrix covers a predetermined number of symbols preceding said bad decision.

19.   A Viterbi decoding method for decoding convolution-coded data blocks, the method comprising:
       processing path metrics on the basis of input soft decision bits, representing an input convolution-coded data block, to populate a decision matrix in a memory with decision values,
       wherein the number of elements of said memory, used for storing the decision matrix, is less than the product of the number of valid states for the input convolution-encoded data block and the number of symbols in the input convolution-encoded data block.

20.   A method according to claim 19, wherein said number is an integer sub-multiple of said product.

21.   A method according to claim 19, including storing path metric sets, associated respectively with a plurality of spaced symbols in the input convolution-coded data block, wherein the path metric processing is performed for distinct

sections of an input convolution-encoded data block using respective ones of said stored path metric sets as a starting state.

22.   A method according to claim 19, including responding to the detection of an error in the decoded data to regenerate a partial decision matrix including a bad decision and modifying the decoded data by tracing back a second best path through said partial decision matrix from said bad decision.

23.   A method according to claim 22, including responding to detection of an error in the decoded data by regenerating a first partial decision matrix including a bad decision and a second partial decision matrix for symbols immediately preceding those for which the first partial decision matrix was regenerated, and modifying the decoded data by tracing back a second best path through said first and second partial decision matrices from said bad decision.

24.   A method according to claim 22, wherein said partial decision matrix covers a predetermined number of symbols preceding said bad decision.

25.   A communication device including a Viterbi decoder according to any one of claims 1·to 6 or 13 to 18.